

UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF COOPERATIVE EXTENSION WORK
AND
BUREAU OF PLANT INDUSTRY COOPERATING

VOLUME 7

February 1929

NUMBER 1

The Extension Pathologist

"TO PROMOTE ECONOMIC CROP PRODUCTION,
IMPROVE THE QUALITY OF PLANT PRODUCTS, AND
REDUCE WASTAGE IN STORAGE, TRANSIT, AND AT THE MARKET"

THE MATERIAL CONTAINED HEREIN IS NOT FOR PUBLICATION EXCEPT BY PERMISSION FROM THE OFFICE
OF COOPERATIVE EXTENSION WORK, UNITED STATES DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

UNITED STATES DEPARTMENT OF AGRICULTURE

OFFICE OF THE ASSISTANT SECRETARY

WASHINGTON

February 1, 1911

Dear Sir:

Very respectfully,

Sincerely,

The Extension Pathologist

TO THE EXTENSION PATHOLOGIST

BY THE ASSISTANT SECRETARY

UNITED STATES DEPARTMENT OF AGRICULTURE

WASHINGTON

Published by the Government Printing Office, Washington, D.C., 1911

NEW YORK CONFERENCE ON EXTENSION WORK
BRINGS SUGGESTIONS REGARDING CONTROL OF BEAN, SWEET POTATO,
TOMATO, CABBAGE, AND BRAMBLE DISEASES

The importance of giving more attention to research and extension work related to the production and distribution of disease-free seeds and plants was emphasized at the conference on extension work which was held in New York City on December 28, as a part of the annual program of the American Phytopathological Society. The crops taken up and leaders of the discussion were as follows:

Beans, M. F. Barrus, New York.
Tomatoes, C. E. Temple, Maryland.
Cabbage, R. H. Porter, Iowa.
Sweet Potatoes, F. W. Fant, North Carolina
(G. L. Zundel of Pennsylvania, who was prepared to act as leader on brambles, was confined to his hotel room with influenza and this topic was consequently withheld from discussion.)

At the conclusion of the half-day session Chairman F. C. Meier appointed committees, the members of which prepared summaries of recommendations for research and extension workers on these crops. Including representatives of commercial groups, forty-five attended the meeting. In addition to the above-named leaders of discussion, the following extension pathologists were present: G. M. Armstrong, South Carolina; Charles Chupp, New York; James Godkin, Virginia; R. A. Jehle, Maryland; T. F. Manns, Delaware; A. L. Pierstorff, Ohio; R. S. Kirby, Pennsylvania; E. C. Sherwood, West Virginia.

Control of Bean Diseases Through the Use of Better Seed. -- M. F. Barrus

The following abstract of discussions was submitted by M. F. Barrus, Chairman of the conference committee on bean diseases. The other members of this committee were R. A. Jehle of Maryland and L. L. Harter of the U. S. Department of Agriculture.

As a result of extensive studies of those diseases of beans the casual agencies of which are carried with the seed, it has come to be recognized that the most practical control measures are those concerned with the production of healthy seed and with the use of resistant varieties.

Although it may be possible in the eastern states to grow healthy seed year after year, this has not been done. The reason has been that farmers are unwilling to practice the necessary precautions to make this possible. However, in certain Western states where environmental conditions are unfavorable for the development of the causal agencies or where these agencies have not yet become prevalent it may be possible and practical to grow bean seed for use in the East and South. For ten years or more advantage has been taken of this knowledge in the production of garden varieties and the results have been more or less satisfactory, especially in the control of anthracnose. The application of this method to the production of seed of field varieties has been more

recent and has been successful in controlling anthracnose and bacterial blight in the case of Red Kidneys grown in the dry sections of California.

The use of resistant varieties of field beans has been an important feature of bean disease control in New York State during the past ten years. Anthracnose-resistant Red Kidneys had largely replaced the ordinary variety until the prevalence of bacterial blight made some other source of seed necessary. Robust pea bean resistant to mosaic saved the pea bean industry in New York. The Perry Marrow resistant to anthracnose, blight, and mosaic has largely replaced the common variety of Marrow. Better and more resistant varieties, or strains of these, are being produced by breeding and selection at experiment stations and these will be used as soon as adequate field tests have proved their value. Consideration has been given to the possibility of growing anthracnose-resistant Red Kidneys in California to insure freedom of the seed from bacterial blight.

Efforts towards securing healthy seed have been attempted in New York and Idaho through bean seed certification based on field inspection, but this measure has not had as rapid development as potato certification. A discussion of the problems connected with bean seed certification should prove to be helpful in making this method more serviceable."

Distribution of bean diseases throughout the Country. -- L. L. Harter.

Beans are being grown for seed in New York, Michigan, Colorado, Wyoming, Utah, Montana, Idaho, and California.

In Idaho and California there is practically no anthracnose nor bacterial blight. Mosaic is prevalent in Idaho but not in California. Bacterial blight is severe but anthracnose is not a factor in Montana, Wyoming, Utah, and Colorado, and in these states mosaic occurs only to a limited extent. All three diseases occur throughout the East.

Snap beans are grown for seed purposes in Montana, Wyoming, Utah, Idaho, Colorado, and in the Santa Clara Valley of California. Red Kidneys are grown for seed purposes in the Sacramento Valley of California and limas along the coast from Santa Barbara south.

Conditions in Maryland. -- R. A. Jehle.

Anthracnose and bacterial blight (all forms) are prevalent and severe on snap beans.

There is a canning and a market garden industry in snap beans and lima beans. The seed used for planting canning beans is usually supplied by the canners and the market gardeners usually obtain theirs from the seed houses. The canners secure the snap bean seed from New York, Michigan, Colorado, and Idaho. The lima bean seed comes from California.

A survey of the snap bean fields showed that those planted with Idaho seed were freest from both anthracnose and bacterial blight. Fields

planted with Colorado seed had less anthracnose than those planted with Eastern seed but they had considerable bacterial blight. California snap bean seed tested at the College and branch farms was as free from anthracnose and bacterial blight as Idaho seed. Experimental tests are being made whereby snap bean seed is grown in California under inspection in cooperation with the California State College of Agriculture and the State Department of Agriculture.

Other Remarks.

W. H. Burkholder, in answer to a question, stated that blight caused by Bacterium medicaginis var. phaseolicola is more serious in cool weather while B. phaseoli is most severe in hot weather. He said that the halo about the spots caused by the former Bacterium is not a dependable diagnostic character and that it is difficult to tell the two diseases apart from the symptoms.

L. L. Harter stated that the climate in the Sacramento Valley is too dry to permit the development of either of these bacterial organisms.

W. D. Moore said that bacterial blight is severe in South Carolina but that anthracnose is not serious. The worst disease is a root rot which cuts the yield materially.

O. C. Boyd reported that bacterial blight is severe in Georgia but that he has been unable yet to determine the source of seed used there.

G. W. Fant found bacterial blight to be prevalent in North Carolina but anthracnose not serious.

C. G. Woodbury said that canners are willing to pay a premium for good seed if they could be assured of its quality. The canners have been able to secure only a fraction of their requirements of Stringless Refugee Green Pod from the West this year because of the damage from hailstorms, and Doctor Woodbury fears that considerable poor-quality seed of this variety will be used in 1929.

E. L. Nixon said that anthracnose and bacterial blight are severe in southern Pennsylvania and that the canners are willing to procure better seed than they now get if it were available. He recommended that pathologists of the U. S. Department of Agriculture who travel through the West observe the condition of beans in respect to the prevalence of diseases and that tests be made in various Eastern and Southern States of seed grown in those sections where beans are freest from these diseases.

This suggestion of Doctor Nixon was favorably received by members of the conference. Among those present indicating a willingness to undertake such a test were E. L. Nixon, T. F. Manns, R. A. Jehle, G. W. Fant, W. D. Valleau (Kentucky), and O. C. Boyd, (Georgia).

Doctor Valleanu suggested that tests be made in fields where the various plots could be isolated one from another so that the value of the various lots could be determined rather than be obscured by the transmission of the diseases from plot to plot.

Doctor Harter and Doctor Jehle consider that it probably will be impossible to secure seed from the West for such tests during 1929 but suggest that it will be desirable for extension pathologists to make a preliminary survey of bean fields to determine varieties grown, source of seed used, and the extent of damage caused by anthracnose, bacterial blight, and mosaic. Should Western seed be used in any fields observed, the condition of the field compared with those planted with Eastern seed should be noted. Should it appear that seed from any district gives better results in general than others, further trials can be made with such seed during 1930. A demand for seed from the best seed-growing localities should be fostered, for where such a demand is insistent and is of sufficient volume, seedsmen will take action in securing such seed.

Production of Disease-Free Sweet Potatoes.

The conference committee on sweet potato diseases submitted the following abstracts of remarks by G. W. Fant and R. F. Poole, both of North Carolina.

Community Improvement of Sweet Potatoes Through Introduction of Disease Control Methods. - - G. W. Fant.

Procedure and Methods:

1. Storage house meetings will prove valuable in the early spring for pointing out losses from disease and for formulating plans for disease control measures.
2. A convenient means for treating a large proportion of the seed potatoes in a community may be employed by treating seed stock as it is removed from storage. This method has been practised by storage house operators in several communities where treating solutions were maintained at storage houses by house operators. In this way seed treatment for a community may be practised at one point.
3. Where the Extension Pathologist cooperates with storage house associations he should urge the use of disease free seed stock for bedding, since seed treatment does not insure disease-free plants when diseased seed is treated and bedded.
4. In the fall, disease control measures should consist in (a) storage house disinfection, and (b) strict grading before storage to eliminate disease-affected potatoes from which decay may spread to sound stock. Badly scurfed potatoes should be eliminated or should be stored by themselves.

5. Whenever possible, in the case of community-operated houses, it is well to require of all growers that seed treatment be practised before the resulting crop may be stored in a community house in the fall. This plan has been used in several instances in North Carolina with very good results.

Some Suggestions Concerning Measures for Certifying and
Developing Disease-Free Seed Stock of Sweet Potatoes

By R. F. Poole.

The wide prevalence of scurf caused by Monilochaetes infuscans and black rot caused by Ceratostomella fimbriata is in one sense a matter of neglect. Plant pathologists should cooperate to a greater extent to bring together recommendations of a more useful nature concerning the control of these two diseases. In addition growers should strive to use methods which will not result in establishing these diseases in the soils where the crop is grown. We are certain of some facts that should enable us to follow a more specific recommendation than that now in vogue, namely:

1. Black rot and scurf-producing fungi are carried over on the seed potato. These fungi may be imbedded in the tissues or the spores may become abundant and live over on the surface. The seed potato is without question the principal source of infection.

2. The causal fungi live over in the soil, but we are not certain as to the length of time that these fungi are able to maintain themselves or as to the conditions favoring their maintenance in the soil.

3. The stem-rot-producing Fusaria are already well distributed throughout the areas producing sweet potatoes. They are known to live in the soil to such an extent that they are not prevented from doing damage where crop rotation is practised, although they may be reduced in abundance.

4. The sporulation of Monilochaetes infuscans, Ceratostomella fimbriata and Fusarium batatas is prolific and in the normal process of handling the crop at harvest and in storage, these fungi become well distributed. A mere tolerance of any one of these would make certification an uncertain piece of work. I therefore wish to offer the following suggestions concerning certification, which to me seem advisable as the result of recent studies:

(a) That no potatoes be entitled to certification if there is any stem rot in the field at the time of field inspection held between August first and fifteenth. Previous roguing of diseased plants may be permissible providing the affected plants do not exceed ten per cent. The date given for inspection is important since little or no stem rot infection will result after the middle of August.

(b) That no potatoes be entitled to certification if black rot or scurf is present in storage when potatoes are inspected after January first. It is advisable to make the bin inspection after January first because of the spread of black rot spores during harvest, since black rot frequently becomes abundant on potatoes which were apparently healthy when stored.

(c) That no potatoes be entitled to certification if there is any mixture of varieties. However, the grower may be permitted to rogue out other varieties before the field inspection.

It is further recommended that inspectors so familiarize themselves with sweet potato diseases that they may be of important service in educating the growers and plant producers as to the fundamentals involved in this work. This is an important phase because at least 90 per cent of the sweet potatoes are home grown, and the success of the certification as needed today will depend upon the growers' appreciation of its value. How and under what conditions it may prove valuable to them and on the other hand result in failures should be taught to those who sell and use certified seed. They should learn that sanitation in plant-bed preparation and the handling of seed stock are of great importance in maintaining so-called disease free seed stock as well as maintaining market quality.

- - - - -

Disease Control in Small Fruits in Pennsylvania.

(Abstract prepared for conference by George L. Zundel of Pennsylvania.)

The extension program in Pennsylvania that has to do with small fruit control is confined almost exclusively to the control of berry diseases. Of the fungous diseases, anthracnose is the most important. This disease is effectively controlled by proper spraying with lime sulphur. During the season of 1928 this disease was present in epiphytotic form in unsprayed berry patches.

The most important diseases to control are the virus troubles, that is, mosaics, leaf curls, and blue stem. This is accomplished by:

1. Teaching of the berry growers to recognize and rogue diseased plants.
2. Establishing disease-free sources of plants.
3. Teaching farmers to avoid planting red raspberries and black raspberries closer than 500 to 1,000 feet apart.
4. Teaching farmers how to properly locate their plantings in relation to wild berries which might act as carriers of the disease.

It is necessary to rogue berry patches at least four or five times during the months from June to October. The late season roguing is necessary to detect late infections of mosaic and blue stem.

*

*

PLANS OF WORK.

At this time of year, when we are busy with the preparation of schedules for the year, it is of interest to see how our colleagues deal with this problem. The following abstracts from the plan submitted by C. E. Graves, Extension Pathologist in Kansas, for 1928, contained good suggestions. F. C. M.

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS

U. S. Dept. of Agriculture and
Kansas State Agricultural College
Cooperating

Extension Service

PLAN OF WORK - 1928

PROJECT NO. 8 - Plant Pathology.

STATE OF KANSAS

I. FACTORS DETERMINING SELECTION OF WORK UNDERTAKEN FOR CURRENT YEAR:

The Plant Pathology project was adopted as a part of the Extension Service in 1920. During the past eight years the main effort has been directed along the lines of vegetable and grain crops disease control. Data has been accumulated through result demonstrations which show the financial benefit derived from recommended practices. The results are very encouraging and are of prime value in forwarding the adoption of plant disease control measures.

1. The first five years were devoted largely to vegetable disease control, especially with Irish potatoes and sweet potatoes. In truck growing districts some cabbage and tomato disease control work has been done. Irish potato seed treatment is now practiced on approximately 80% of the commercial acreage.

At present spindle tuber is the principal Irish potato disease that is causing losses. Certified seed or disease-free seed inspected in the seed fields in the north during the growing season is the recommended control. Work on spindle tuber control has been under way for two years. Good results have been obtained as is evidenced by the fact that in 1927 only 9,000 bushels from certified seed were grown, while this year records show that already more than 60,000 bushels of certified seed has been purchased for planting 4,000 acres. Twenty-five result demonstrations show that certified seed gives an average increase of 25 to 50 bushels per acre over commercial seed.

2. The second phase to be adopted was smut control work in sorghums and wheat. This phase was started in 1925. The smut epidemic in wheat in 1926 was the cause of widespread interest in seed treatment. The ease of application of copper carbonate for

sorghum smut control which was widely adopted the spring of 1926 and 1927 aided in a large acreage of wheat being treated these years. During the past two years forty result demonstrations show sorghum seed treatment increasing the yield approximately two bushels per acre. Thirty seed treatment demonstrations on wheat show the average treated seed wheat yielding almost a bushel more per acre than the untreated.

II. PHASES OF PROJECT TO BE UNDERTAKEN AND DISTRIBUTION OF WORK:

A. Vegetable Diseases.

1. Irish Potato Disease Control. This work will be done in the commercial Irish potato growing districts of the Kaw Valley and the Arkansas Valley.
 - (a) Seed treatment result demonstrations, comparing new treatment with the old ones will be continued. Corrosive sublimate and hot formaldehyde have proven successful. Some organic mercury compounds are being sold which should be compared before their adoption is recommended.
 - (b) Spindle tuber result demonstrations using spindle tuber seed with good type seed will be carried on. Also certified seed will be compared with commercial seed as a practical means for showing that certified seed will outyield commercial seed because it contains a minimum of spindle tuber infection.
 - (c) 4-H Potato Club Membership will be increased. Last year 61 potato club boys made a net profit of over \$15,000.
2. Sweet Potato Disease Control. This work will be conducted with commercial growers in the Kaw Valley and in the Arkansas Valley.
 - (a) Seed treatment of sweet potato seed is practiced on at least 75% of the commercial acreage. Two result demonstration will be conducted.
 - (b) Hill selection of sweet potato seed for stem rot control demonstrations, will be conducted with seed selected the past fall.
 - (c) Sweet potato seed certification will be carried on as in the past two years in order to furnish growers good seed if they do not wish to practice hill selection.
3. Cabbage Disease Control.
 - (a) Yellow-resistance varieties will be distributed for demonstration purposes. Two cooperators have been secured in the Arkansas Valley.

B. Grain Crops Disease Control.

1. Wheat Smut Control. At present there are 33 organized counties in the Wheat Belt. Special work will be conducted in sixteen counties in central and southwest Kansas. It is planned to conduct district leaders training schools, county wheat schools, result demonstrations and farm tours as major parts in the wheat smut control phase.
2. Sorghum Smut Control. This work will be conducted in the same counties that are taking up wheat smut control work. The same methods will be used as this work is closely associated with wheat smut control.
3. Corn Disease Control. Seed treatments for corn are advocated by certain manufacturers as a means for controlling corn ear, stalk and root rot diseases. Experiments so far show no beneficial effect from corn seed treatment in this state. Result demonstrations will be conducted in the Kaw Valley and in northeast Kansas comparing treated and untreated seed.

COUNTIES INCLUDING PLANT PATHOLOGY PROJECT.

A. Vegetable Disease Control.

MAJOR COUNTIES

Shawnee
Douglas
Wyandotte

MINOR COUNTIES

Jefferson Sedgwick
Leavenworth Reno
Johnson Pawnee
Riley

B. Grain Crops Disease Control.

MAJOR COUNTIES

Sumner	Moade
Sedgwick	Clarke
Harper	Comanche
Kingman	Pawnee
Reno	Ford
Rice	Gray
Pratt	Finney
Barton	Hodgeman
McPherson	Nees

MINOR COUNTIES - Wheat train
and check-
work

Saline
Harvey
Lincoln
Ottawa

1928

MAJOR COUNTIES

Summer	Clarke
Sedgwick	Comanche
Harper	Pawnee
Kingman	Ford
Reno	Gray
Rice	Finney
Pratt	Hodgeman
Barton	Ness
Meade	

MINOR COUNTIES -- Working

through district
leaders training
schools.

Ness
Saline
Harvey
McPherson
Ottawa
Lincoln

III. GOALS FOR YEAR IN COUNTIES ADOPTING PROJECT

A. Vegetable Disease Control

1. 80% Irish potatoes planted with treated seed.
2. 30% Irish potatoes planted with certified or field inspected seed.
3. 100 Boys 4-H Potato Club members.
4. 75% sweet potatoes planted with treated seed.
5. 50% sweet potatoes planted with certified or hill selected seed.
6. Two cabbage yellows result demonstrations completed and records taken.

B. Grain Crops Disease Control.

1. Wheat smut controlled on 40% acreage.
2. Sorghum smut controlled on 40% acreage.
3. Ten corn seed treatment result demonstrations.

IV. PLANS OF PROCEDURE. County plans are to be developed in each major project county. These plans to include in detail the present situation, reason for adopting certain phases, detailed plan of procedure, work to be done by county agents, project leaders and specialist, method of measuring results and goals for the year.

Director of Extension

Specialist.

June 16, 1928

Date approved

METHODS OF PROCEDURE

Project No. 8 - Plant Pathology.
Sub-Project No. 8A - Vegetable Disease Control.

STATE OF KANSAS

I. FACTORS DETERMINING SELECTION OF THIS SUB-PROJECT:

1. Commercial Irish and sweet potato production is practiced extensively in the Kaw and Arkansas River bottoms. Approximately 20,000 acres of Irish potatoes and 5,000 acres of sweet potatoes are grown for market in these districts. It is estimated that 1,000 acres of cabbage is grown also for market.

2. Vegetable diseases are taking a large toll. Due to the past seven years work Rhizoctonia is being satisfactorily controlled on 80% of the acreage by seed treatment. However, Spindle Tuber, Black Leg and Scab are still causing serious losses in Irish potatoes. Stem rot is taking the greatest loss in sweet potatoes while black rot is being controlled by seed treatment and fumigation. Cabbage yellows is causing the largest loss of any disease attacking this crop.

3. Kaw Valley county potato growers are well organized for educational work. They have their problems not only in disease control, but also in the advantage of securing higher yielding strains and varieties, boys' 4-H Potato Club Work, soil fertility and insect control. They are anxious to cooperate further in the Potato Improvement Program.

II. GOALS.

6 A-1: Irish Potato Disease Control.

- (1) 80% of commercial Irish potato acreage planted with treated seed.
- (2) 80% Irish potato acreage planted with certified seed or with seed personally selected in the seed fields in the north by the Kansas growers.
- (3) 60 4-H Irish Potato Club Members.

6 A-2: Sweet Potato Disease Control.

- (1) 80% commercial sweet potato acreage planted with treated seed.
- (2) 80% of sweet potato acreage planted with certified seed or with hill-selected seed.

6. A-3: Cabbage Disease Control.

- (1) Cabbage yellows controlled on 80% of commercial acreage.

III. SUGGESTED PROCEDURE AND PROGRAM ORGANIZATION.

6 A-1 Irish Potato Disease Control.

1. Three main features in the way of getting growers together to receive work. These to include insect control, soil fertility, marketing and plant disease control.

- (a) Pre-planting season meetings to distribute later information. To be county-wide meetings.
 - (b) Potato Tour during growing season to inspect result demonstrations.
 - (c) Potato Show in the fall for educational program and exhibits.
2. Conduct result demonstrations:
- (a) Seed treatment vs. untreated.
 - (b) Certified seed vs. commercial.
 - (c) Spindle tuber vs. good type.
 - (d) Strain and variety tests.
3. Organize Boys Potato Clubs.

6 A-2 Sweet Potato Disease Control.

1. Potato Show for educational program and exhibits.
2. Conduct result demonstrations.
 - (a) Seed treated vs. untreated.
 - (b) Hill selected seed vs. field run.
 - (c) Certified seed vs. field run.

PROGRAM ORGANIZATION.

1. Plans for Plant Pathology Project developed by specialist, members of subject matter department and committee of county agents at State Extension Conference.
2. Detailed plans for county campaign to be developed by specialist and county agents.

3. Each sub-project is based on a 5-year scheme of organization as follows:

(a) First year

Introduce seed treatment demonstrations on Irish and sweet potatoes. Distribute yellows resistant cabbage seed to be used on sick soil.

(b) Second year

Continue the above and add some spindle tuber plots in Irish potato work. Only the same work should be done on sweet potatoes and cabbage.

(c) Third year

Check results of above by more demonstrations and add plots comparing certified Irish and sweet potato seed.

(d) Fourth year

By this time seed treatment of Irish and sweet potatoes is well known but continue with a few demonstrations on seed treatment. Work hard on certified seed. Use spindle tuber demonstrations. Add boys' 4-H Club work.

(e) Fifth year

Growers well organized and seeking more light on new problem. Continue a few of the old demonstrations and start variety and strain work. Hold tours and shows and give much publicity on progress.

6A3 - Cabbage Disease Control

Distribute yellows resistant seed in counties producing large acreage of cabbage.

DISTRIBUTION OF YEAR'S WORK BY COUNTIES

Year	1st year	2nd year	3rd year	4th year	5th year
1928	2	2	6	0	0
1929	2	2	2	6	0
1930	2	2	2	2	6
1931	6	2	2	2	2
1932	2	6	2	2	2

IV. DIVISION OF RESPONSIBILITY:

1. Specialist will assist in planning State and County program, prepare suggested circular letters and news articles, secure material for demonstration plots, help plant demonstration plots, assist with their harvest, visit county at least three times during year for planning work and holding meetings and working on plots. Summarize results at end of each year.
2. County agent will secure demonstrators, supervise planting of plots and harvesting, arrange for meetings, tours, help secure exhibits for show, summarize results for this county at end of each year.
3. Local leaders will assist agent in locating demonstrations, holding meetings, report results for his community.
4. Local demonstrator will conduct plots according to minimum require essentials and keep necessary record to make demonstrations convincing.

V. LITERATURE AND ILLUSTRATIVE MATERIAL AVAILABLE.

1. Available material to be used.
 - (a) Experiment Station Bulletin - Potato Disease Control in Kansas.
 - (b) Extension Circular - Treating Potato Seed.
 - (c) Extension Circular - Value of Certified Potato Seed in Kansas.
 - (d) Extension Circular - Sweet Potato Diseases in Kansas.

(e) U. S. D. A. - Colored charts showing potato diseases.

2. Material to be prepared

(a) Records for taking results.

(b) Radio talks.

(c) Charts for potato show.

VI. MEASURING RESULTS.

1. The units of measurement will be:

(a) Number of farmers adopting practice.

(b) Acres affected by adoption of practice.

(c) Money saved by adopting practice.

2. Methods of securing results

(a) Harvest result demonstration plots for data.

(b) Surveys of county agents.

(c) State Board of Agriculture reports.

(d) Questionnaires to growers.

Approved by the Procedure Committee on the Plant Pathology Project,
Annual Extension Conference, October 17 - 22, 1927.

C. E. Graves, Extension Plant Pathologist.

E. C. Miller, Acting Head, Dept. Botany and Plant Pathology, K.S.A.C.

O. H. Elmer, Plant Pathologist, K. S. A. C.

R. E. Williams, County agent, Barton County.

W. H. Robinson, County agent, Shawnee County.

Duke D. Brown, County agent, Jefferson County.

W. H. Von Trebra, County agent, Rice County.

(GRAIN CROPS DISEASE CONTROL OMITTED)

- - - - -

FEED MIXERS AS SEED WHEAT TREATERS.

Recently my attention was called to the possibility of using feed mixers for treating seed grains with dust disinfectants. Among companies manufacturing this type of machinery are the following. 1/

Burton Feed & Mixer Company, Detroit, Michigan.
B. F. Gump Company, 431-437 So. Clinton St., Chicago, Ill.
S. Howes Company, Inc., Silver Creek, New York.
Sprout, Waldron & Company, Muncy, Penna.

It seems possible that this type of machine may be useful in connection with custom treating at mills and elevators or in seed houses where it is desired to treat seed before shipment. F. C. M.

- - - - -

NEW CIRCULAR ON EXTENSION CAMPAIGNS.

Planning and Conducting Extension Campaigns, Department Circular No. 58, by H. W. Hochbaum, Senior agriculturist, Office of Cooperative Extension Work, contains much of interest to extension workers. Based on the author's personal experience in all sections of the United States, this circular gives concrete suggestions on planning and carrying out extension programs. Copies may be obtained by addressing the U. S. Department of Agriculture. F. C. M.

1/ The inclusion of names in this list implies no endorsement by the U. S. Department of Agriculture, nor is any discrimination intended if the name of any firm has been omitted.

EXTENSION WORK IN 1594.

"Summon a parley, sirs, that we may know
Whether these mushrooms here will yield or no."

(1594, Greene, Selimus Wks. (Grosart) XIV., 282. -- From "Romance of the Fungus World, by R. T. Rolfe.)

- - - - -

Articles, news notes, or suggestions with regard to subjects that might profitable be discussed in this news sheet, should be addressed to:

F. C. Meier,
Extension Plant Pathologist,
Bureau of Plant Industry,
U. S. Department of Agriculture,
Washington, D. C.

